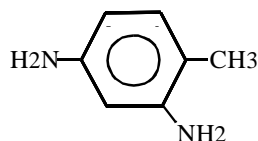


2,4-TOLUENE DIAMINE

2,4-Toluene diamine is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 95-80-7

Molecular Formula: $C_7H_{10}N_2$



2,4-Toluene diamine (or toluene-2,4-diamine) exists in the form of colorless crystals. It is soluble in hot water, alcohol, hot benzene, and ether (HSDB, 1991).

Physical Properties of 2,4-Toluene Diamine

Synonyms: 4-methyl-1,3-benzenediamine; 1,3-diamino-4-methylbenzene; toluene-2,4-diamine; 2,4-diaminotoluene; m-tolylenediamine; m-toluylenediamine; MTD

Molecular Weight:	122.17
Boiling Point:	292 °C
Melting Point:	99 °C
Vapor Pressure:	1 mm Hg at 106.5 °C
Log Octanol/Water Partition Coefficient:	0.337
Water Solubility:	7,470 mg/L
Henry's Law Constant:	1.2×10^{-9} atm-m ³ /mole
Conversion Factor:	1 ppm = 5.0 mg/m ³ (as gas)

(Howard, 1990; HSDB, 1991; Sax, 1987; Sax, 1989; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

Major sources of 2,4-toluene diamine are facilities producing this compound and facilities using it in the production of diisocyanates. Other sources include photographic developing and the production of polyurethanes, dyes, impact resins, polyamides for wire coating, antioxidants, hydraulic fluids, urethane foams, and fungicide stabilizers (HSDB, 1991).

B. Emissions

No emissions of 2,4-toluene diamine from stationary sources in California were reported, based on data obtained from the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

No information about the natural occurrence of 2,4-toluene diamine was found in the readily-available literature.

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of 2,4-toluene diamine.

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of 2,4-toluene diamine was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

The atmospheric half-life and lifetime of 2,4-toluene diamine due to reaction with the hydroxyl radical is estimated to be 1.3 hours and 1.8 hours, respectively (Becker et al., 1988). It is also possible that 2,4-toluene diamine directly photolyzes in the atmosphere (Howard, 1990).

AB 2588 RISK ASSESSMENT INFORMATION

Since no emissions of 2,4-toluene diamine from stationary sources in California have been reported under the AB 2588 program, it was not listed in any of the risk assessments reviewed by the Office of Environmental Health Hazard Assessment.

HEALTH EFFECTS

Probable routes of human exposure to 2,4-toluene diamine are inhalation, ingestion, and dermal contact (Sittig, 1991).

Non-Cancer: Exposure to 2,4-toluene diamine may cause severe eye and skin irritation, methemoglobinemia, central nervous system depression, and degeneration of the liver. Symptoms include skin blistering, nausea, vomiting, jaundice and anemia (Sittig, 1991; U.S. EPA, 1994a).

The United States Environmental Protection Agency (U.S. EPA) has determined that the health effects data on 2,4-toluene diamine are inadequate for the derivation of a Reference Concentration (RfC). The U.S. EPA has not established an oral Reference Dose (RfD) for 2,4-toluene diamine (U.S. EPA, 1994a).

A significant decrease in the number of births, and increases in maternal deaths, stillbirths and resorptions from exposure to 2,4-toluene diamine were reported in animal studies (U.S. EPA, 1994a).

Cancer: Rats and mice exposed to a dietary intake of 2,4-toluene diamine were found to develop a significant increase in the incidence of a large variety of tumor types, including liver, mammary gland, subcutaneous fibromas, lung lymphomas, and leukemia. The liver tumors were the most prevalent tumor type observed in both rats and mice. The U.S. EPA has classified 2,4-toluene diamine (2,4-diaminotoluene) in Group B2: Probable human carcinogen (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified 2,4-toluene diamine in Group 2B: Possible human carcinogen (IARC, 1987a).

The State of California under Proposition 65 has determined that 2,4-toluene diamine (2,4-diaminotoluene) is a carcinogen (CCR, 1996). The inhalation potency factor that has been used as a basis for regulatory action in California is 1.1×10^{-3} (microgram per cubic meter)⁻¹ (OEHHA, 1994). In other words, the potential excess cancer risk for a person exposed over a lifetime to 1 microgram per cubic meter of 2,4-toluene diamine is estimated to be no greater than 1,100 in 1 million. The oral potency factor that has been used as a basis for regulatory action in California is 4.0 (milligram per kilogram per day)⁻¹ (OEHHA, 1994).

